

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

**DINWOODIE**

Atty. Ref.: **2-336**

Divisional of Serial No. **09/230,366**

Group:

Filed: **November 7, 2001**

Examiner:

For: **COMPOSITE MAT**

\* \* \* \* \*

**November 7, 2001**

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

**PRELIMINARY AMENDMENT**

Preliminarily amend the above-identified application as follows.

**IN THE SPECIFICATION**

Amend the specification as follows:

Please amend the specification by inserting the following paragraph before the first line:

--This application is a division of Application No. 09/230,366, filed January 26, 1999, which in turn is a 37 of PCT/GB97/01971 filed July 22, 1997, the entire content of which is hereby incorporated by reference in this application.--

**IN THE ABSTRACT**

Insert the attached Abstract, after the claims pages.

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**IN THE CLAIMS**

Amend the claims as follows.

Cancel claim 2, without prejudice.

Amend claims 3-24, 28, 29, 30, 32 and 33 as follows.

3. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the first and second layers are held together by the adhesive action of the binder contained in the second layer.

4. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the distribution of the binder in the second layer is such that the percentage by weight of binder in each 1 mm<sup>3</sup> region of the layer based on the total weight of the layer in that region is within 40 % of the overall percentage by weight of binder in the layer based on the total weight of the layer.

5. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the distribution of the binder in the second layer is such that the percentage by weight of binder in each 1 mm<sup>3</sup> region of the layer based on the total weight of the layer in that region is within 10 % of the overall percentage by weight of binder in the layer based on the total weight of the layer.

6. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the second layer has a laminar shear strength of at least 0.2 MPa.

7. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the second layer is capable of exerting a pressure of at least 1.0 kgf/cm<sup>2</sup> when a sample of the layer having a thickness in the range of from 5 to 10 mm

is compressed to a thickness of 3 mm between two plates and the binder removed.

8. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 7, wherein the second layer is capable of exerting a pressure in the range of from 1.5 to 4.0 kgf/cm<sup>2</sup> when a sample of the layer having a thickness in the range of from 5 to 10 mm is compressed to a thickness of 3 mm between two plates and the binder removed.

9. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the intumescent material contained in the first layer is an unexpanded layer silicate mineral.

10. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 9, wherein the unexpanded layer silicate mineral is unexpanded vermiculite.

11. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 9, wherein the unexpanded layer silicate mineral is in the form of flakes.

12. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 10, wherein the first layer is a composite sheet comprising a combination of unexpanded vermiculite flakes, an organic binder, an inorganic filler and optionally a fibrous inorganic material.

13. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the inorganic fibres contained in the second layer are thermally stable at temperatures in excess of 700°C.

14. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the inorganic fibres contained in the second layer are ceramic fibres.

15. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 13, wherein the inorganic fibres contained in the second layer are polycrystalline inorganic oxide fibres selected from the group consisting of alumina fibres, mullite fibres, aluminosilicate fibres, aluminoborosilicate fibres, zirconia fibres and titania fibres.

16. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 15, wherein the inorganic fibres contained in the second layer are alumina fibres.

17. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the inorganic fibres contained in the second layer are short staple fibres having a length in the range of from 1 to 10 cms and a mean diameter in the range of from 1 to 10 microns.

18. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the binder contained in the second layer is an organic material.

19. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 18, wherein the binder is an organic polymer.

20. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 19, wherein the binder is a polymer derived from curing a curable precursor polymer composition.

21. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 20, wherein the binder is a polymer derived from curing a curable precursor polymer composition comprising an acrylic polymer and an epoxy group containing cross-linking agent.

22. (Amended) A catalytic converter or diesel particulate filter as claimed in

claim 35, wherein the second layer contains from 2 to 15 % by weight of binder based on the total weight of that layer.

23. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 35, wherein the second layer has a density in the range of from 30 to 700 kg/m<sup>3</sup>.

24. (Amended) A catalytic converter or diesel particulate filter as claimed in claim 23, wherein the second layer has a density in the range of from 100 to 500 kg/m<sup>3</sup>.

28. (Amended) A method as claimed in claim 25, wherein a combination of dielectric heating and a flow of hot air is employed in the drying step.

29. (Amended) A method as claimed in claim 25, wherein microwave or radio frequency heating is employed.

30. (Amended) A method as claimed in claim 25, wherein the impregnated fibre mass is held under compression during at least a part of the drying step.

32. (Amended) A method as claimed in claim 30, wherein the pressure which is applied during the drying step to compress the impregnated fibre mass is in the range of from 5 to 500 Kpa.

33. (Amended) A method as claimed in claim 25, wherein the fibre mass which is impregnated is a multi-fibre product in which the individual fibres are assembled into a low density mat.

Add the following claim:

--35. (new) A catalytic converter or diesel particulate filter comprising a ceramic monolith within a metal casing with a composite fibre mat inbetween, the mat being from about 3 to 15 mm thick, the mat comprising first and second layers, the first layer

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comprising an intumescent material and the second layer comprising a plurality of inorganic fibres and a binder which is substantially uniformly distributed throughout the second layer and which binds the fibres together and binds the second layer to the first layer, the second layer having a laminar shear strength of at least 0.1 mPa, whereby the mat maintains its integrity when the binder is burned in use of the converter or filter.--

**REMARKS**

Claim 2 has been canceled, without prejudice.

Claim 35 has been added.

Claims 1 and 3-35 are pending.

An early and favorable Action on the merits is requested.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By: \_\_\_\_\_



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**MARKED-UP CLAIMS**

3. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim [2] 35, wherein the first and second layers are held together by the adhesive action of the binder contained in the second layer.

4. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim [2 or claim 3] 35, wherein the distribution of the binder in the second layer is such that the percentage by weight of binder in each 1 mm<sup>3</sup> region of the layer based on the total weight of the layer in that region is within 40 % of the overall percentage by weight of binder in the layer based on the total weight of the layer.

5. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim [4] 35, wherein the distribution of the binder in the second layer is such that the percentage by weight of binder in each 1 mm<sup>3</sup> region of the layer based on the total weight of the layer in that region is within 10 % of the overall percentage by weight of binder in the layer based on the total weight of the layer.

6. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of claims 2 to 5] claim 35, wherein the second layer has a laminar shear strength of at least 0.2 MPa.

7. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of claims 2 to 6] claim 35, wherein the second layer is capable of exerting a pressure of at least 1.0 kgf/cm<sup>2</sup> when a sample of the layer having a thickness in the range of from 5 to 10 mm is compressed to a

thickness of 3 mm between two plates and the binder removed.

8. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 7, wherein the second layer is capable of exerting a pressure in the range of from 1.5 to 4.0 kgf/cm<sup>2</sup> when a sample of the layer having a thickness in the range of from 5 to 10 mm is compressed to a thickness of 3 mm between two plates and the binder removed.

9. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the intumescent material contained in the first layer is an unexpanded layer silicate mineral.

10. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 9, wherein the unexpanded layer silicate mineral is unexpanded vermiculite.

11. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 9 [or claim 10], wherein the unexpanded layer silicate mineral is in the form of flakes.

12. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 10, wherein the first layer is a composite sheet comprising a combination of unexpanded vermiculite flakes, an organic binder, an inorganic filler and optionally a fibrous inorganic material.

13. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein



the inorganic fibres contained in the second layer are thermally stable at temperatures in excess of 700°C.

14. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the inorganic fibres contained in the second layer are ceramic fibres.

15. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 13 [or claim 14], wherein the inorganic fibres contained in the second layer are polycrystalline inorganic oxide fibres selected from the group consisting of alumina fibres, mullite fibres, aluminosilicate fibres, aluminoborosilicate fibres, zirconia fibres and titania fibres.

16. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 15, wherein the inorganic fibres contained in the second layer are alumina fibres.

17. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the inorganic fibres contained in the second layer are short staple fibres having a length in the range of from 1 to 10 cms and a mean diameter in the range of from 1 to 10 microns.

18. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the binder contained in the second layer is an organic material.

19. (Amended) A [laminated composite mat] catalytic converter or diesel

particulate filter as claimed in claim 18, wherein the binder is an organic polymer.

20. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 19, wherein the binder is a polymer derived from curing a curable precursor polymer composition.

21. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 20, wherein the binder is a polymer derived from curing a curable precursor polymer composition comprising an acrylic polymer and an epoxy group containing cross-linking agent.

22. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the second layer contains from 2 to 15 % by weight of binder based on the total weight of that layer.

23. (Twice Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in [any one of the preceding claims] claim 35, wherein the second layer has a density in the range of from 30 to 700 kg/m<sup>3</sup>.

24. (Amended) A [laminated composite mat] catalytic converter or diesel particulate filter as claimed in claim 23, wherein the second layer has a density in the range of from 100 to 500 kg/m<sup>3</sup>.

28. (Amended) A method as claimed in claim 25 [or claim 27], wherein a combination of dielectric heating and a flow of hot air is employed in the drying step.

29. (Amended) A method as claimed in [any one of claims 25, 27 or 28] claim 25, wherein microwave or radio frequency heating is employed.

30. (Amended) A method as claimed in [any one of claims 25 to 29] claim 25, wherein the impregnated fibre mass is held under compression during at least a part of the drying step.

32. (Amended) A method as claimed in claim 30 [or claim 31], wherein the pressure which is applied during the drying step to compress the impregnated fibre mass is in the range of from 5 to 500 Kpa.

33. (Amended) A method as claimed in [any one of claims 25 to 32] claim 25, wherein the fibre mass which is impregnated is a multi-fibre product in which the individual fibres are assembled into a low density mat.